Roll No:
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St. Claret College

Autonomous, Bengaluru

ST. CLARET COLLEGE LIBRARY Bengaluru-13 AUTONOMOUS

UG END SEMESTER EXAMINATION-NOVEMBER 2025
B.SC I SEMSTER
ST 124: DESCRIPTIVE STATISTICS

TIME: 3 hours. **MAX. MARKS: 80**

This paper contains THREE printed pages and FOUR parts

Instructions:
1. Verify and ensure that the question paper is completely printed.
2. Any discrepancies or questions about the exam paper must be reported to the COE within 1 hour after the examination.
3. Students must check the course title and course code before answering the questions.

PART-A

Answer all questions. Each answer carries ONE mark. **[1 x 10 = 10]**

1. What is the primary distinction between a population and a sample in statistics?
   a) A population includes all members of a defined group, while a sample is a subset of that group.
   b) A sample includes all members of a defined group, while a population is a subset of that group.
   c) A population is always larger than a sample, regardless of the data.
   d) A sample can only consist of qualitative data, while a population consists of quantitative data.
2. Which of the following types of data is characterized by having a true zero point and equal intervals?
   a) Nominal b) Ordinal c) Interval d) Ratio
3. Which graphical representation is best suited for displaying the distribution of a frequency distribution with continuous data?
   a) Bar chart b) Histogram c) Pie chart d) Line graph
4. Which measure of central tendency is calculated by taking the average of the logarithms of the values?
   a) Arithmetic Mean b) Geometric Mean c) Harmonic Mean d) Median
5. What is the primary purpose of calculating the variance in a data set?
   a) To find the middle value
   b) To measure the average distance of data points from the mean
   c) To identify the mode of the distribution
   d) To calculate the total number of observations

6. Which of the following statement is true about Karl Pearson's correlation coefficient?
   a) It measures the strength and direction of a linear relationship between two variables.
   b) It can be used for non-linear relationships.
   c) It is unaffected by outliers in the data.
   d) It is always between -1 and 2.
7. In the context of simple linear regression, what does the least squares method aim to minimize?
   a) The total number of observations
   b) The sum of the squared differences between observed and predicted values
   c) The slope of the regression line
   d) The mean of the data points
8. What does the variance-covariance matrix represent in multivariate statistics?
   a) The means of multiple variables
   b) The relationship between the means of two variables
   c) The variances of each variable along the diagonal and the covariances between pairs of variables in the off-diagonal entries
   d) The correlation coefficients between pairs of variables
9. In multiple linear regression, what does the multiple correlation coefficient indicate?
   a) The strength of the relationship between two independent variables
   b) The overall strength of the relationship between the dependent variable and all independent variables
   c) The average of the residuals
   d) The slope of the regression line
10. What is the purpose of calculating a partial correlation coefficient?
   a) To measure the total correlation between all variables
   b) To assess the strength of the relationship between two variables while controlling for the effects of one or more additional variables
   c) To determine the variance explained by a single independent variable
   d) To compute the overall mean of multiple variables

PART-B

Answer any TEN questions. Each answer carries TWO marks. **[2 x 10 = 20]**

11. State any two scopes of statistics.
12. Define an attribute and variable with an example.
13. Name any two diagrammatic representations of frequency distribution.
14. Write the formula for geometric mean and harmonic mean.
15. Define deciles and percentiles.
16. What do you mean by Outliers?
17. What do you mean correlation?
18. Write the normal equation used for fitting a parabola.
19. Write the formula for spearman's rank correlation coefficient with ties.
20. Define covariance matrix
21. Write the multiple regression equation of X1 on X2 and X3
22. State any two properties of residuals.

PART-C

Answer any FOUR questions. Each answer carries FIVE marks. **[5 x 4 = 20]**

23. Explain the construction of histogram.
24. Prove that AM ≥ GM ≥ HM
25. Prove that correlation coefficient is independent of change of origin and scale.
26. Explain the concept of least square method.
27. State and prove any two properties of partial correlation coefficient.
28. State and prove any two properties of residuals.

PART-D

Answer any THREE questions. Each answer carries TEN marks. **[10 x 3 = 30]**

29. a) Describe any two sampling techniques.

    b) Explain the scales of data measurements with example (4+6)

30. a) Explain the different absolute and relative measures of dispersion.

    b) Prove the relationship between the non-central and central moments. (5+5)

31. a) Calculate median from the following data:

Classes	4-8	8-12	12-16	16-20	20-24
Frequency	3	7	16	8	2

    b) Explain skewness and kurtosis with an example. (5+5)

32. a) Obtain the regression equation of Y on X

    b) State any two properties of regression coefficient. (6+4)

33. Obtain the coefficient of multiple correlation coefficient $R^2_{1.23}$

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